The impact of heat on health and productivity among maize farmers in tropical climate area

ABSTRACT

Background: Heat stress disorders may cause negative health outcome and subsequent productivity reduction especially in those who work under direct sunlight for an extended number of hours. Objective: This study assessed the impact of heat on the health and productivity among maize farmers in a hot tropical country. Methods: A cross-sectional study was conducted among 396 maize farmers, randomly selected across Gombe province, Nigeria. The wet bulb globe temperature monitor (WBGT) Model QuesTemp036 was used in determining the heat index. Health was determined using a validated questionnaire, while productivity was determined by recording work output based on the number of ridges cultivated during the working hours. Results: The farms recorded mean heat index with standard deviation (SD) of 31.56 (2.19) and 34.08 (1.54) in the hours of 9 am to 12 pm and 12-3 pm respectively, which exceeded the threshold level set by the ACGIH. Heavy sweating (93.2%), tiredness (48.5%), dizziness (34.1%), and headache (40.4%) were experienced by the respondents almost on daily basis. The finding further showed a significant difference in the farmers' productivity during the three time duration of the work day ($p < 0.001$). The productivity was significantly higher between the hours of 6-9 am ($p < 0.001$) and 12-3 pm ($p < 0.001$), compared to the hours of 9 am to 12 pm ($p < 0.001$). The factors that significantly predict the productivity outcome include temperature ($p < 0.001$), gender ($p < 0.001$), age ($p=0.033$), and BMI ($p=0.008$). Conclusion: The farmers were frequently experiencing heat exhaustion which decreased their productivity.

Keyword : Heat stress; Maize farmers; Hot tropical country